

Name: \_\_\_\_\_

Hour: \_\_\_\_\_

## Cells (Part 2) Study Guide **KEY**

### Photosynthesis

1. Write or draw the **chemical equation** for photosynthesis. (What Goes In and Comes Out?)

Sunlight (Light Energy) + Carbon Dioxide ( $\text{CO}_2$ ) + Water ( $\text{H}_2\text{O}$ )  $\longrightarrow$  Glucose/Sugar ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) + Oxygen ( $\text{O}_2$ )

2. Draw a picture to show the **cell part** where photosynthesis happens. (Be sure to label it.)

Photosynthesis happens in chloroplasts.



3. Explain **why** plants do photosynthesis. (What are they really trying to make?)

They are trying to make glucose (a form of sugar, which is food for their cells).

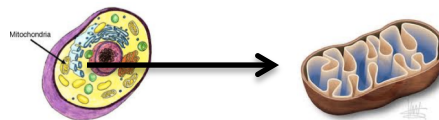
### Respiration

4. Write or draw the **chemical equation** for respiration. (What Goes In and Comes Out?)

Glucose/Sugar ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) + Oxygen ( $\text{O}_2$ )  $\longrightarrow$  ATP (Cell Energy) + Carbon Dioxide ( $\text{CO}_2$ ) + Water ( $\text{H}_2\text{O}$ )

5. Draw a picture to show the **cell part** where respiration happens. (Be sure to label it.)

Respiration happens in mitochondria.



6. Explain **why** cells do respiration. (What are they really trying to make?)

The cells need ATP energy to do everything they do to stay alive (making things, moving things, etc.).

## Photosynthesis-Respiration Cycle

7. Imagine the sun stopped shining tomorrow. Explain **what** you think would happen and **why**. (Be as specific as possible, keeping the photosynthesis-respiration cycle in mind.)

All the plants on earth would stop being able to do photosynthesis. This means they could not make glucose. The plants would soon die because their cells need the glucose for making ATP. With no plants, all animals would die because all animals eat either plants or other animals that originally ate plants. All life on the planet would cease to exist. In other words, global extinction (death)! So thank your lucky stars every day the sun rises ☺.

## Specialized Cells

Imagine you are a passenger on the magic school bus with Ms. Frizzle! You are shrunk to explore the inside of the dead body from mystery cells, to try and find more of the invading cells we saw.

Describe two different types of body cells you might find as you investigate.

8. What do they look like? (Describe with words and/or draw pictures)

Examples:

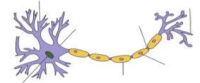
Red Blood Cells:  
(concave disc)



Muscle Cells:  
(long and thin)



Nerve Cells:  
(branching)



9. What is their job?

Red Blood Cells: carry oxygen from the lungs to the cells, and carbon dioxide from the cells to the lungs

Muscle Cells: help the body move (arms, legs, intestines, eyes, heart (beat), etc.)

Nerve Cells: carry signals (electrical messages) around the body – brain to body, and body to brain

10. Explain why these cells are good at doing their job.

Red Blood Cells: they are round and flexible so they don't get stuck in the blood vessels

Muscle Cells: they are long and skinny so they can shorten (contract) to make movement possible

Nerve Cells: they are long and branched to send messages far away and to many places at once

11. Explain how they are similar and/or different from each other.

Similar: They are all cells, and they all help the body to function.

Different: Red Blood Cells are small and circular, whereas muscle cells and nerve cells are both long and skinny. Also, they all do different jobs (see #10).

## Levels of Organization

### **"It's Alive!!!"**

You are an "inventor" working in a lab in large castle somewhere in the dark European countryside. Your neighbors all think you are crazy, but you know you are a genius on the verge of one of the greatest discoveries known to mankind!!! Your name is not important, but it sounds a little bit like "Spankinshtein." You are working on creating life in the lab. Being a super-genius, you know that you must start with tiny living things and combine them until you eventually have a whole living organism.

Using the work bank and template below, describe the steps you would take to construct your monster... uh, I mean your living thing. ☺

<b>Word Bank:</b>	<b>Organ</b>	<b>Tissue</b>	<b>Organism</b>	<b>Cell</b>	<b>Organ System</b>
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12. I will start with the smallest unit of life, the \_\_\_\_ **cell** \_\_\_\_.
13. Next, I will put some of these \_\_\_\_ **cells** \_\_\_\_ together to make \_\_\_\_ **tissue** \_\_\_\_.
14. Then, I will take all of this \_\_\_\_ **tissue** \_\_\_\_ and put it together to make an \_\_\_\_ **organ** \_\_\_\_.
15. Once I have multiple \_\_\_\_ **organs** \_\_\_\_ that work together, I will have an \_\_\_\_ **organ system** \_\_\_\_.
16. Finally, I will use many \_\_\_\_ **organ systems** \_\_\_\_ to build one \_\_\_\_ **organism** \_\_\_\_.

This will be my very own living thing! I just hope it is friendly, but what could go wrong ;)

### **Alternate opening scene:**

You walk to your cabinet to find some small units of life. You open the cabinet and SCREAM!!!! You are out of cells! ☹ You know you put cells on your Mad Scientist shopping list, but somehow you are out. Since you are no quitter, you head to the store to buy more, but they are out too! However, they do have ATOMS. Explain how you can use these atoms to make yourself some cells.

17. I will take my atoms and combine them to form \_\_\_\_ **molecules** \_\_\_\_.
18. Then I will combine these \_\_\_\_ **molecules** \_\_\_\_ to form \_\_\_\_ **organelles** \_\_\_\_.
19. Finally, I will use many \_\_\_\_ **organelles** \_\_\_\_ and a few other things, like cytoplasm, to form some small units of life...cells! Now I can get back to creating that multicellular organism that will help me take over the world! Hahahahahahahaha...